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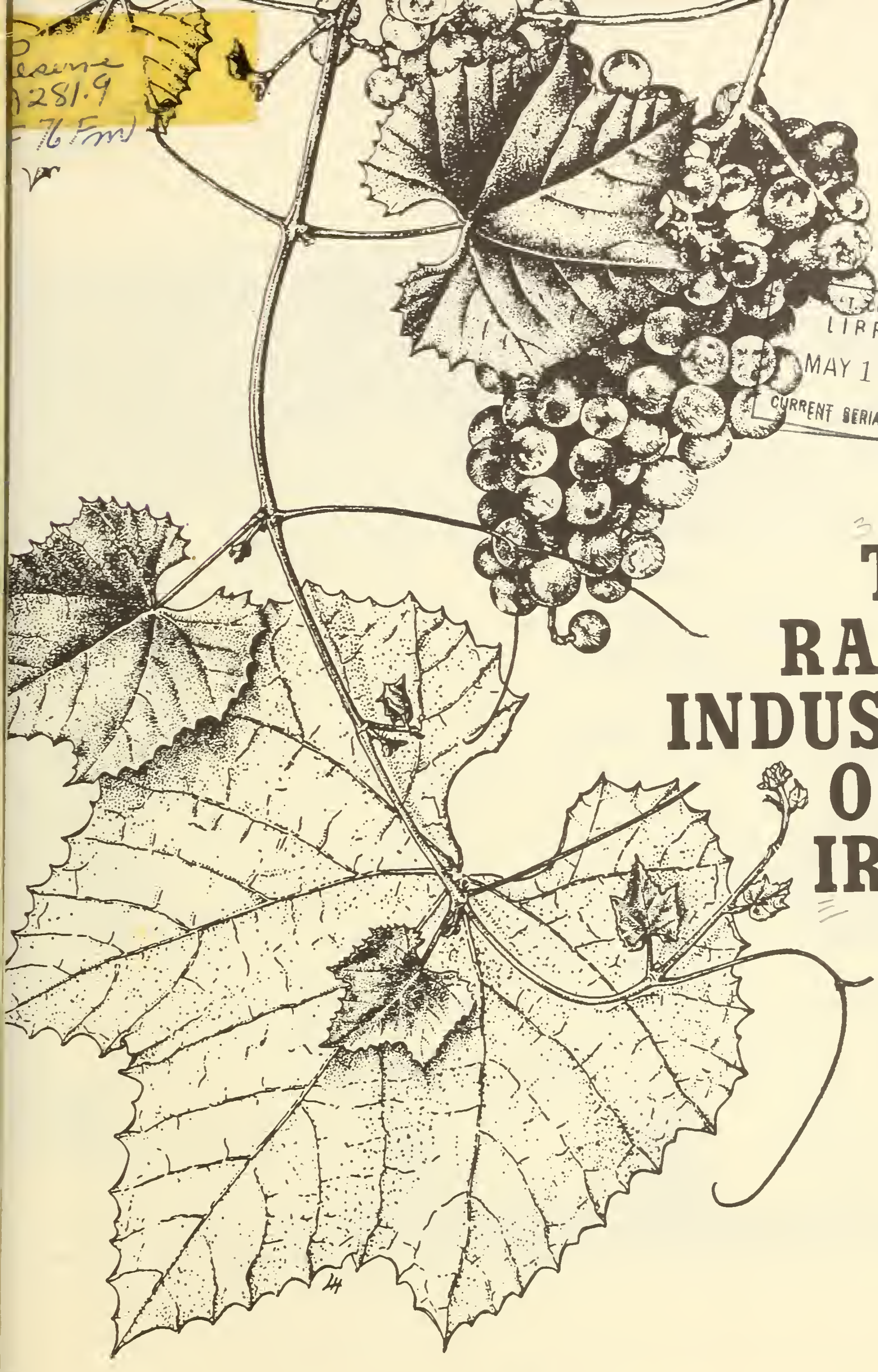

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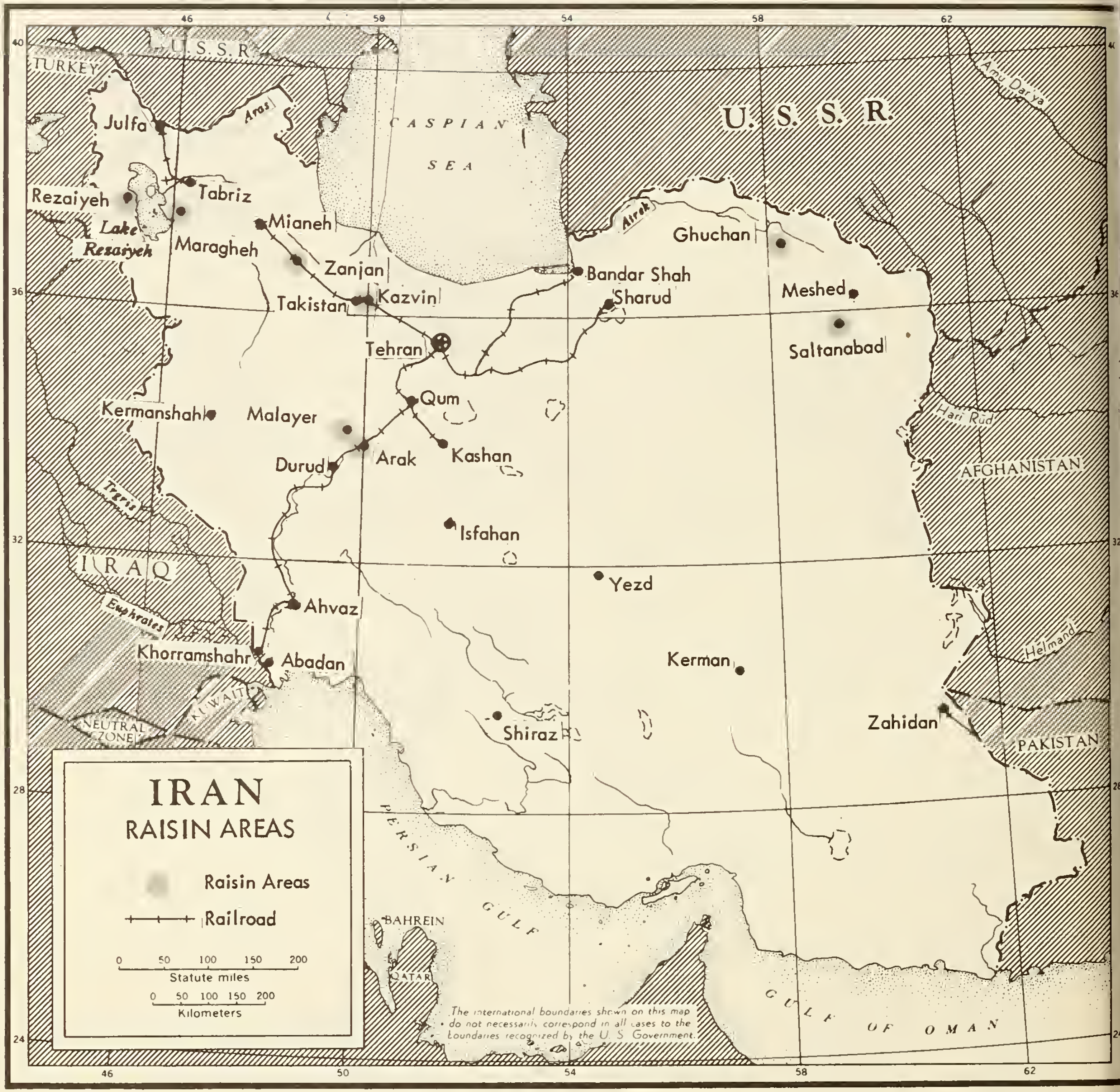
THE RAISIN INDUSTRY OF IRAN

Foreign Agriculture Service, U.S. Department of Agriculture
Fas-M-114 April 1961



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FOREWORD

Iran is one of the Big Five among world raisin exporters. Its production and exports have risen sharply over the past two decades.

This report, based on a survey carried out in Iran and supplemented by other sources of information, describes this newly expanded industry and evaluates Iran's potential as a competing supplier of raisins in world markets.

D. M. Rubel, Director
Fruit and Vegetable Division

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THE RAISIN INDUSTRY OF IRAN

By Stanley Mehr
Fruit and Vegetable Division

Production

Iran is the fourth largest raisin producer in the world. Only the United States, Australia, and Turkey exceed Iran in raisin output, as the latest figures (1954-58) show:

	1,000 short tons
United States	188.5
Australia	75.2
Turkey	71.2
Iran	66.0
Greece	53.4
Spain	14.3
Union of South Africa	7.8
Cyprus	6.5
Total	482.9

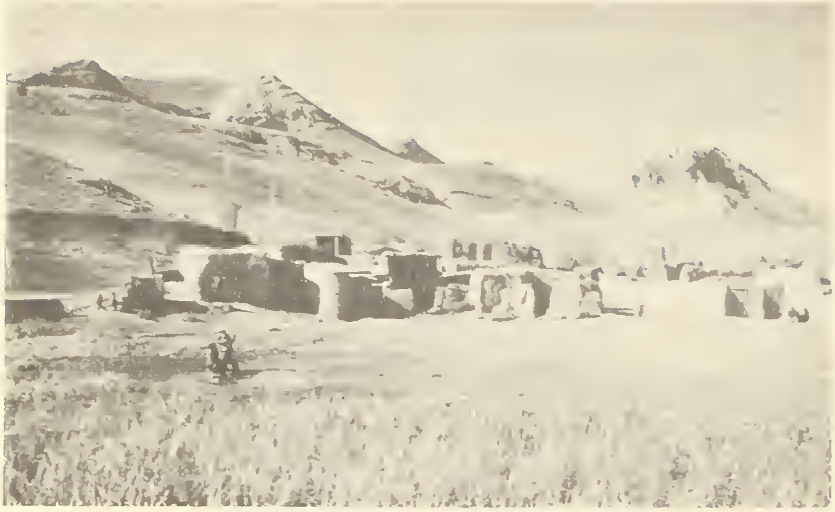
Iranian production has increased strikingly in the last 20 years. So has Iran's share of the world pack, though world production has risen too, as shown by the following averages:

	World pack 1,000 short tons	Iranian pack 1,000 short tons	Iranian share Percent
1935-39	446.0	36.0	8
1949-53	480.6	46.0	10
1954-58	482.9	66.0	14

Varieties

Although Iran grows a great many varieties of grapes and dries several different ones, the sultana variety is far and away dominant in the raisin industry. It is a seedless variety closely related to the Thompson Seedless of California. Its berries are smaller than the Thompson and are oblate to round. The sultana is also known as the Round Kechmish, while the Thompson is variously known as the sultanina or Oval Kechmish.

There is also a substantial production but insignificant export volume of seeded raisins. However, they are significant in the marketing of Iran's raisins abroad--in a negative sense--because they are sometimes found mixed together with the seedless raisins. Since European importers of sultanas find the admixture of seeded raisins objectionable, Iranian packers have to cull seeded raisins out of some of the batches of sultanas delivered by the peasants.



Village in northwest Iran typical of those to be found in the Malayer raisin producing areas.

Some of the seeded raisins are very similar to the Muscat. According to an authority on raisin varieties, 1/ they are variously handled in Iran so as to resemble cluster Malagas or stemmed Valencias. A small-seeded variety commonly grown is known in Iran as Ascari and a large-seeded variety as Frachti.

Acreage and Yields

There are no statistics--official or unofficial--on Iran's raisin acreage and yields. Even for production, there are no official estimates, only unofficial estimates made by Iranian packers and European importers. In estimating production, it is at least possible to use export data available for previous seasons to provide some indication as to the size of earlier packs. However, there is virtually nothing to provide a reliable indication on the acreage in any one year, the regional distribution of acreage, and the annual per acre yields. Further, there are no indications whatsoever as to the relative acreages of bearing and nonbearing vines--which would furnish some insight on future production.

From discussions on raisin yields with Iranian agricultural experts and raisin producers, it appears that the average sultana yield is in the vicinity of 1 short ton per acre, as raisins, resulting from a 4-ton grape yield. However, there is a considerable range in yields, and many vineyards reportedly produce as little as 0.6 ton per acre or as much as 1.3 tons. In comparing Iranian raisin yields with those of other countries, it appears that the average for Iran is only about 50 percent of the per acre production of Greece and the United States.

A calculated acreage may be derived from the production and yield estimates. An average production of 66,000 tons from land yielding 1 ton per acre means 66,000 bearing acres of sultanas for raisins. But this does not account for the entire sultana bearing-age acreage since a substantial tonnage of sultanas is also grown for use as fresh table grapes,

---

1/ George Schneider, Director, Gebroeder Catz, Rotterdam.

"pekmes" (grape sugar), juice, and wine. These latter uses account for perhaps 35 percent of the Iranian sultana acreage. This means another 35,000 acres of sultanas, giving a total bearing area of roughly 100,000 acres of sultanas.

Producing Areas

There are five main raisin-producing areas dispersed across northern Iran--from the Turkish border in the west to the Soviet-Afghanistan border on the east.

TABLE 1.--Production of raisins in Iran, average 1935-39, 1949-53, 1954-58, and annual 1950-60

Year	Production	Year	Production
	1,000 Short tons		1,000 Short tons
Average:		Annual:	
1935-39	36.0	1954	55.0
1949-53	46.0	1955	66.0
1954-58	66.0	1956	68.0
Annual:		1957	72.0
1950	50.0	1958	69.0
1951	54.0	1959	67.0
1952	50.0	1960	50.0
1953	54.0		

The elevation in these producing regions is probably higher than that at which sultanas are grown in any other major raisin-producing country--between 3,281 and 6,562 feet. Iran itself is a great plateau rimmed by mountains and with a salt desert in the center. Its climate is markedly continental except in the coastal plains (by the Caspian Sea in the north and Persian Gulf in the south).

Summers are extremely hot and dry and winters are cold. Contributing to the winter cold are the height of the plateau itself and the mountain barriers of the south and west which are high enough to prevent the penetration of maritime influences from the Persian Gulf and the Mediterranean. On the other hand, cold dry air is able to flow in from Siberia.

In northwest and western Iran it snows a few days in December, January, and February. There is less frequent snowfall in eastern Iran. Thawing begins in March, providing vitally needed irrigation water. Most of the annual precipitation occurs from November through May. A little rain also falls in June and October. The months of July, August, and September are usually bone dry.

As for latitude, most of Iran's raisin areas are located between 34°N. and somewhat north of 37°. This is fairly similar to the location of major northern hemisphere raisin areas elsewhere, i.e., Fresno, Calif., 36°45', Iraklion, Greece 35°20', and Izmir, Turkey 38°24'.

In addition to the production of the five principal raisin areas in Iran, a small tonnage is also produced in scattered areas of minor importance. The five main areas are usually designated by the towns they lie closest to. These areas and the proportion of the raisin pack they approximately account for are as follows:

	Percent
Rezaiyeh................	30
Maragheh................	18
Kazvin-Zanjan...........	20
Malayer-Arak............	12
Ghuchan-Saltanabad......	15
Others (Shiraz, etc.)...	5

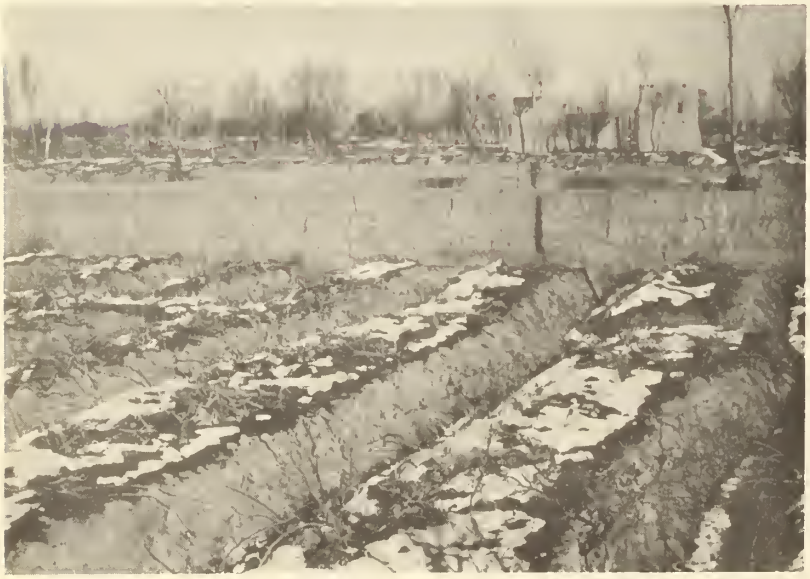
It must be emphasized that these figures are simply approximations. There is actually considerable difference of opinion in the Iranian dried fruit industry as to the tonnage produced in each of these areas.

Rezaiyeh

Rezaiyeh is probably the most important raisin district of Iran. The town of Rezaiyeh itself is 375 miles northwest of Tehran (as the crow flies) and is just to the west of the large salt lake which bears the same name.

Before World War II, both town and lake were known as Urmia, and the European import trade still designates raisins from this district as "Urmias." Rezaiyeh is only 137 miles by road from the Soviet border and is therefore the source for much of Iran's raisin exports to the USSR.

It is estimated that Rezaiyeh produces about 20,000 short tons of raisins, on the average, or 30 percent of Iran's output. Packers' estimates of production in recent years range between 13,000 and 22,000 tons.



In Reziyeh, sultana vines are planted in trenches like these and their trunks and main arms trained to grow up the north bank of the ridge. This is done to protect them against severe winters of the area.

Though the elevation at Rezaiyeh is 4,400 feet above sea level, the terrain in which the town and surrounding vineyards are located is flat. However, mountains, which are snow-covered much of the winter, are visible to the north, south, and west. The soils are silt and clay loams and fairly deep. Technicians consider the soils low in nitrogen and somewhat deficient in phosphorous, but possessing adequate potash.

The average annual rainfall at Rezaiyeh (16.7 inches) is greater than at Fresno (9.4 inches) but less than at Iraklion (20.3 inches) and Izmir (28 inches). Very little rain falls during the summer; most of the precipitation occurs in the winter and spring. Monthly distribution of rainfall at Rezaiyeh is as follows:

Dry season	Inches	Rainy season	Inches
June	0.8	November	1.3
July	.3	December	1.6
August	.1	January	1.9
September	.1	February	1.5
October	.5	March	2.0
Subtotal	1.8	April	3.6
		May	3.0
		Subtotal	14.9
		Annual total	16.7

Rezaiyeh at 37°33' N. is the northernmost Iranian raisin district. The last killing spring frost usually occurs during April and the first killing frost in the fall generally takes place in November. This means a growing season of approximately 180 days--a much shorter one than in the California raisin districts. (Fresno has an average growing season of 295 days and Reedley 263 days.)

Although Rezaiyeh summers are hot, temperatures do not get as high as in the San Joaquin Valley of California; in both July and August the average maximum for Rezaiyeh is 91°F. Of particular pertinence to sultana culture is the severity of the cold in winter. The average maximum temperature in January is 32°F. and the average minimum is 17°F. February is similarly cold. By contrast, the January average temperature at Fresno is 45.5°F. and at Iraklion, 51°F. Also, as low as zero has been recorded at Rezaiyeh while the lowest Fresno temperature in 40 years was 17°F.

The winter cold is reportedly the reason for the unique culture of sultana vines in this part of Iran. Parallel earthen ridges are erected from east to west in each vineyard. These ridges alternate with deep wide furrows. The banks of the ridges slope somewhat toward the top, resulting in flat-topped ridges about 12 feet wide at the base and possibly 6 feet wide on top. The ridges are about 3 feet high and about 25 to 50 feet long before being terminated by a ground-level walk-through at right angles to ridges and furrows. The vines are planted in the bottom of the trench and the trunk and main arms are trained to grow up the north bank of the ridge with the canes appearing on the top of the ridge.

Peasants differ in explaining why they plant their vines this way but agree that they have traditionally been planted so. However, there may be very good basis for this type of culture. First, the trenches fill with snow in winter, which helps insulate the trunks and roots from the severe cold experienced in this region. Second, all of the precipitation--as snow or rain--is caught in the trenches, maximizing the use of the limited moisture available. Third, the ridges serve to support the vines, protecting them against breaking under the weight of heavy snow. Furthermore, the northern exposure minimizes premature sprouting in the spring and possible damage from late frosts.

There are serious disadvantages also in this system of culture. The ridges and trenches are expensive to build and maintain--in terms of labor. Even more important, they make all operations--cultivating, spraying, and harvesting--very difficult to carry out, even though they are done by hand. It is impossible to employ even the simplest machinery, for example a garden tractor or small power sprayer, in this veritable labyrinth of adjoining small vineyards, each a network of ridges and trenches. To complete the inaccessibility, a group of adjoining vineyards (owned by one landlord but operated by several sharecroppers) is often enclosed by a wall made of mud and straw, from 3 to 8 feet high, with entrance limited to a doorway.

Vines are spaced from 3 to 6 feet apart within the furrow, and the distance between furrows is governed by the width of the base of the ridge--often 12 feet. Vines are planted as solid stands; there is no interplanting with trees or other crops, possibly because the trench cultivation makes interplanting impractical.

Sultanas are by far the main variety of grapes grown at Rezaiyeh. A leading horticultural specialist in the area estimated that sultanas represented 95 percent of the grapes grown in the Province of Azerbaijan (which includes the producing centers of Rezaiyeh and Maragheh). A seeded grape variety (Kischmisch) is also found intermingled among the sultanas. More progressive growers are grafting these over to sultanas particularly since the seeded variety allegedly has a very vigorous rootstock.

Pruning begins about the first of March. Vines are trained to a few main spurs--up to as many as 10. These spurs are cut back to 3 to 5 buds each. The resulting number of canes per plant varies considerably. Vines were observed almost side by side with as few as 20 and as many as 50 canes.

Propagation is by layering. This makes it very simple to fill gaps in the rows. Virtually all vines are on their own roots. No American rootstocks are used.

Use of commercial fertilizer in vineyards is virtually unknown. Some animal manure is applied but on a very limited scale since much of the stable manure is utilized for fuel. Wood ashes are accumulated for 2-3 years and then spread in vineyards. Also, the remains of old walls of buildings are commonly gathered together and spread in the vineyard furrows. These remains are mainly a mixture of clay, decomposed straw, and possibly other organic matter. Though the nutrient content of these are probably negligible, they seem to help plant growth in some way, possibly because of the effect of organic matter on soil tilth.

Spraying or dusting is generally confined to the use of sulfur against powdery mildew (oidium), which sometimes causes serious damage. Powdered sulfur or micro-sulfur is dusted or sprayed, respectively, upon the vines and may be applied as many as three times--once before blooming, once after blooming, and finally when small berries have formed. However, in some localities, growers do not find it necessary to combat powdery mildew, nor is downy mildew generally considered serious enough to warrant use of fungicides. Apparently there is no phylloxera in Iran, but the grape vine moth, Lobesia botrana, was found to be serious enough in the Rezaiyeh area for the Iranian Government to finance a control program. In the years 1954 through 1958 a DDT spray program was carried out, which effectively controlled this insect.

The extent to which growers depend upon irrigation varies considerably. As a rough estimate, perhaps one-third of the vineyards in the Rezaiyeh district are irrigated. The amount of water applied depends principally on how much is available during a given summer (from winter snows) and the amount of spring rainfall. One common practice is to irrigate the first time before blooming and the last time in August. The fact that many growers (possibly two-thirds) do not irrigate is attributed to a high water table in the area.

The size of the individual vineyard in Rezaiyeh is small by California standards but fairly similar in acreage to the Greek or Turkish sultana vineyard. The most common size is in the 2½ to 7½ acres range, according to a horticultural expert stationed in Azerbaijan. This was borne out in a typical village that was visited near Rezaiyeh where virtually all of the vineyards are of 3 to 5 acres size. Only three vineyards in this village exceeded 15 acres.

Maragheh

The Maragheh district ranks as the second or third largest producer of raisins in Iran. It is centered around the town of this name, about 300 miles northwest of Tehran, immediately east of Lake Rezaiyeh.

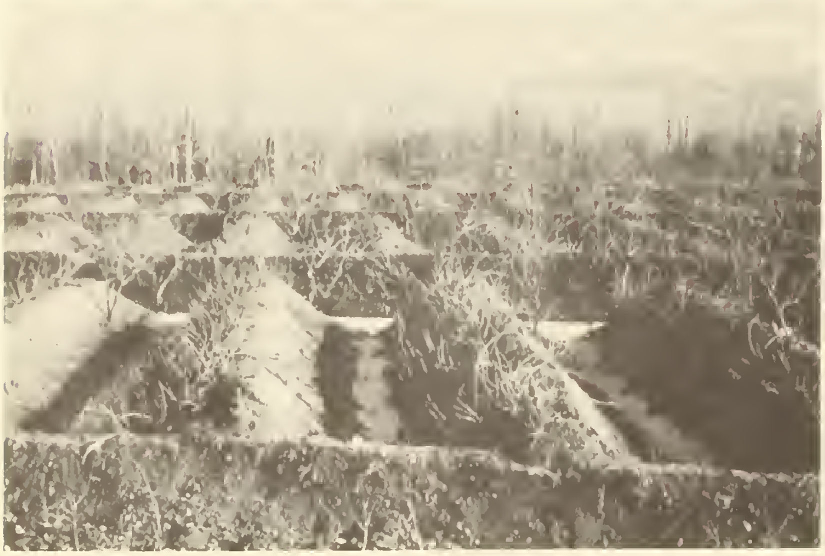
Maragheh produces perhaps 12,000 tons of raisins annually, as a rough average. Production in the area has reportedly varied between 9,000 and 13,000 short tons.

Although Maragheh is not quite as far north as Rezaiyeh, it is situated at a higher elevation--5,300 feet above sea level. As a result, the growing season is even shorter than that of Rezaiyeh; it is only about 5 months long, with the last spring frost usually in April and the first killing frost in October. Winters are cold--the minimum temperature averaging near or below zero in January and February.

Annual rainfall at Maragheh averages 14.5 inches--about 2 inches less than at Rezaiyeh. The distribution is similar: summer and fall are very dry while almost all of the year's precipitation falls during the winter and spring.

The terrain on which the vineyards are located is level. The soil appears to be a deep crumbly silt loam of grey color.

In the Maragheh area also, the culture of sultanas is distinguished by the planting of the vines in deep furrows between earthen ridges. These ridges vary somewhat from those in the Rezaiyeh area by being higher--about 6 feet from the top of the ridge to the base of the furrow. Also the ridges taper to a peak instead of being flat-topped, i.e., in end view they are triangular, while the trenches are V-shaped.



Maragheh vineyards, like those in Rezaiyah, are a series of ridges. In Maragheh, however, ridges are higher and peaked. Close-up shows how vines grow along sides of the ridges.

Spacing between vines ranges between 4.5 and 7.5 feet. Pruning appears similar to that practiced at Rezaiyeh, with the numerous canes emanating from spurs which in turn branch off from a long sinuous trunk resting on the earthen bank.

Other cultural practices are also similar to those employed at Rezaiyeh, and yields are believed to be similar, possibly slightly lower.

The size of vineyards at Maragheh, too, is small. Although there are vineyards as large as 50 acres, most are below 7½ acres.

Except for almond trees which are frequently found scattered about vineyards, interplanting is not practiced.

The vine moth has been discovered at Maragheh too, but thus far has not been as serious as in Rezaiyeh.

Kazvin-Zanjan

The Kazvin-Zanjan area probably ranks second or third in tonnage of raisins produced. The city of Kazvin is 85 miles northwest of Tehran and the city of Zanjan 90 miles further northwest. There is a heavy concentration of sultana vineyards around Kazvin, but the production area as a whole extends as far as Zanjan. Takistan, a town 20 miles southwest of Kazvin, is also an important producing center. Both cities are on one of Iran's few railroad lines, this one, the line between Tehran and Azerbaijan.

Estimates of the production in this district vary markedly, ranging from 9,000 to 22,000 short tons. Some of this discrepancy may be due to the fact that this is probably the only district which has experienced a considerable expansion in production--due to new plantings--in the last few years. Some authorities probably, therefore, tend to cite the normal production level prevailing a few years ago while others are more cognizant of the large tonnages produced most recently. Striking an average of the varying estimates, one arrives at an annual output of 13,000 tons, representing 20 percent of Iran's production, although this may be less than is being currently produced. This volume of production places the Kazvin-Zanjan area on a par with Maragheh as second most important in Iran. However, with new plantings coming into bearing and an increase of bearing surface on young fruiting vines the tonnage produced in this area should definitely exceed that of Maragheh. According to one prominent Kazvin packer, production in the area had doubled--from 10,000 to 20,000 tons in the last 10 years and will continue to increase to about 30,000 tons.

The elevation of this area is likewise high--probably in excess of 4,000 feet above sea level. Although climatological data are lacking, the area's climate is quite similar to that of Azerbaijan's, with hot, dry summers, cold winters, and a relatively short growing season.

Unlike Azerbaijan, the culture of sultanas does not involve the use of ridges and trenches in the vineyards. Instead, each vine sets in the middle of a specially created saucerlike depression. Each basin is roughly a yard in diameter and a few inches deep. For winter protection, soil is heaped over the canes--the tips of the longest ones being pruned off--so that only the trunks (which grow horizontally) remain exposed.

Spacing is quite generous, about 9 feet each way.

Plantings are completely enclosed by a wall-like ridge of earth about 3 feet high, except for a gap which permits the entry of irrigation water. The enclosed areas are quite small--often smaller than a city lot.

The vineyards are irrigated until the vines bloom. Thereafter they receive no water because water is normally no longer available and if it were, the berries would be inundated since the canes are near ground level.

The vineyards are solidly planted to vines; there is no intercropping with field crops or fruit trees, except for an occasional almond tree here and there.

Above, sultana in Malayer vineyard, with canes covered for winter protection by mounds of soil. Left, vines in Ghazvin are planted in saucerlike depressions, and all except trunks are soil-covered.

Of the varieties grown, sultanas predominate. There are two seeded varieties grown: One with small berries known as Ascari, and a large-berried type called Frachti. These seeded varieties are considered a nuisance by packers--they have to incur the additional expense of having them sorted out from the sultanas since growers ship raisin varieties all mixed together. Many table grapes have also been planted.

The application of fertilizer is very limited. The Iranian Government has a rather vigorous program to extend the use of fertilizer but only a very small acreage of grapes has so far been fertilized.

Although spraying--for insects and diseases--is relatively new and still inadequately practiced, it is much more common than use of fertilizer and is rapidly becoming widespread. The vine moth has been found at Zanjan too, but infestation has not assumed serious proportions.

Most of the vineyards reportedly range in size between 2½ and 15 acres, with about half of the acreage in sultanas and the other half in seeded varieties.

Malayer--Arak

The raisin tonnage in the Malayer-Arak area is estimated at 8,000 short tons, on the average, which would rank it last among Iran's five main raisin districts. This tonnage represents about 12 percent of Iran's raisin output.

It is located south of the Kazvin-Zanjan district. The cities of Malayer and Arak are 165 miles and 140 miles, respectively, southwest of Tehran. The sultana vineyards are found in the territory between the two cities.

Although this is the southernmost producing region (34°N.) of Iran, it is at the highest altitude. Malayer and Arak are at the extraordinary elevations, for raisin production, of 5,961 feet and 6,168 feet, respectively, above sea level. This is possibly the highest elevation at which raisins are produced commercially anywhere in the world.

The climate here too is quite severe, with hot summers and cold winters. At Arak, the temperature in January and February may fall below zero, while during July and August it may be well over 100°F.

The frost-free period is about 180 days--May through October.

Rainfall is limited, averaging only 13 inches per year at Arak. Practically all of the precipitation occurs in the months of December through May. Summer and early fall are dry.

Culture of the vines in this area combines the methods used in both Kazvin and Azerbaijan. The vines are planted on top of flat ridges about 6 feet wide. Separating the ridges are irrigation furrows about 2 feet deep. The vines are very unevenly spaced, the distance between plants varying from 3 to 7½ feet. The irregularity of spacing is due to the fact that the ridges and furrows are not laid out geometrically, as in Azerbaijan, but curve every which way with the contour lines of the terrain so as to permit flow of irrigation water. In the winter the vines are all but buried by soil heaped over them (as at Kazvin).

As in the other producing areas, the vineyards themselves are situated in pockets of relatively dark loamy soil although the surrounding countryside is barren and desertlike.

According to a local agricultural official the yield, in terms of raisins, ranges between 0.9 and 1.3 short tons per acre.

Powdery mildew is serious in this area; although many growers apply sulfur, mildew damage is considerable because spraying is still a relatively new practice and growers do not perform the job adequately.

Commercial fertilizer is not used; some animal manure is applied.

There has been quite a bit of new planting of sultanas in this district--for use as table grapes in Tehran and other urban centers. When the fresh market is glutted, some of the growers may turn to drying the grapes.

Ghuchan-Saltanabad

Ghuchan-Saltanabad, the easternmost raisin-producing region of Iran, is located approximately 400 miles northeast of Tehran, not far from the Turkmen Soviet Socialist Republic and Afghanistan borders. It is also known as the Meshed area, after the capital of the Province, which is a little east of the main sultana plantings. These extend about 100 miles--from the city of Ghuchan south to the village of Saltanabad. This territory is generally believed to produce approximately 10,000 tons of raisins annually, with some estimating the volume as high as 13,000 tons.

Although Ghuchan is no further north (37°06') than the Azerbaijan raisin centers, and its elevation (4,100 feet) is less than the west Iran raisin districts, the climate is subject to as great extremes as any. Summer temperatures can rise to well over 110°F. and winter temperatures fall below zero. The growing season is extremely short--the number of frost-free days averaging only about 150--May through September--although severe frost has also been recorded in May.

Rainfall volume and distribution are similar to that of the other producing regions. The annual volume averages about 14 inches, with virtually none of it during July, August, September, and October. Even the area receiving that much rainfall is sharply circumscribed: at Meshed, 80 miles southeast of Ghuchan rainfall averages just 8.4 inches annually, and at Sabzevar, 80 miles to the southwest, it amounts to only 6.6 inches per year.

Culture of the sultanas in this district does not involve the use of trenches. In the colder parts of the area the vines are covered with soil for winter protection. In other localities they are grown erect and not considered requiring protection against cold.

Many of the raisins produced here are shipped to packinghouses in Tehran and the western part of the country for processing.

Other Areas

A few other areas account for the balance of Iran's raisins: A minor quantity, possibly 3,000 tons, representing 5 percent of the country's total. Only one locality is of note among these areas--Shiraz, in the Province of Fars, where considerable planting of grapes, mainly for table use and wine, has been taking place.

Shiraz is far south of the traditional grape-growing areas of Iran or other countries, at 29°36'N. Its altitude of 5,000 feet, however, results in its summer climate being only moderately warmer than in the northern producing areas. Of particular significance, its winters are distinctly milder than further north; though frost occurs, the temperature remains substantially above zero and the frost-free growing season is at least 180 days. Annual precipitation averages about 13 inches, with nearly all of it falling in December through April. Vines in this section require none of the elaborate winter-protection measures used further north.

The emergence of Shiraz as a producer of citrus, truck crops, sugar beets, cotton, and grapes, among other crops is attributable to the development of a highway to the Persian Gulf which will make the area much more accessible, the construction of a large fertilizer plant to be completed in 1962, and the successful sinking of wells at fairly shallow depths.

Existing plantings of vines are handled as a dryland crop.

Social and Economic Influences

Fully as important as the physical factors affecting each area's production are social and economic influences. These are much the same for all of the producing areas in Iran.

The Iranian peasant is generally illiterate and impoverished. (The average per capita income for the entire Iranian population is a little over $100 per year.)

Land ownership is feudalistic, although steps are being taken to modify this. As late as 1958 possibly 70 percent of the land was in the hands of (1) large landowners, (2) the state, and (3) religious organizations. The large landowner in Iran owns whole villages (including schools, stores, etc.) or shares of different villages. The land is generally worked on a share-cropping basis and the landowner is usually an absentee. Frequently the land is leased to a third party who deals directly with the peasants.

In calculating the division of a crop between landlord and tenant, five elements are considered: Land, water, seed or plants, labor, and animal power. By custom each element is worth 20 percent of the crop. Thus, a tenant farmer operating a vineyard may receive only 40 percent of the crop--for his family labor and animal power.

All of these factors contribute to the continuation of the present level of technology in the production of vine fruits--or any other crop. It is also unlikely that any substantial improvement in cultural and farm-drying methods will come about in the next few years unless the problems posed by ignorance, lack of capital, and inadequate incentives are solved. It does not seem probable that these obstacles can be overcome in a few years. To educate the farmers, for instance, would require a manyfold expansion of the experiment station and extension systems, which are only in a rudimentary state. It will be a long time before enough trained personnel and resources will enable an adequate rural educational plant.

However, in comparison with other crops, raisins are the most profitable--except in those localities with ready access to large cities, which enables the marketing of more lucrative crops, such as table grapes and vegetables. (There has been a considerable expansion of grapes for table use, particularly between Tehran and Kazvin.) Aside from these exceptions, raisin production represents the most intensive use of land--certainly much more so than the alternative crops in these five areas, such as small grain, cotton, or the customary semiwild deciduous tree fruits and nuts. Although a "breakthrough" in improvement of yields or quality is unlikely in the near future, there is nevertheless every indication that the acreage and processing capacity of sultanas will be well maintained since the returns per acre are high relative to that for other crops. Also, being a storable commodity, the grower is less vulnerable to the market gluts and violent price fluctuations that characterize fresh fruit.

Processing

Field Drying

Harvesting starts about September 12 in Azerbaijan and a week earlier further south, and lasts 7 to 10 days for most producers and about 20 days for the larger ones. Drying takes 5 to 8 days, generally 7, for soda-dipped raisins and about 12-14 days for undipped raisins. Practically all of the sultanas in the Rezaiyeh area are dipped--possibly over 95 percent--because of the lateness of the harvest there, which leaves only a limited period of good drying weather. For all of Iran, possibly 85 to 90 percent of the sultanas are dipped; only in the Kazvin area are a substantial proportion of the sultanas not dipped.

By the time an Iranian sultana has been laid down to dry it has undergone much more handling than the California grape. First, the clusters are picked into small containers. Then they are transferred into larger wooden boxes or baskets and carried to the drying yard--on donkey back if the yard is not adjacent to the vineyard. The grapes are then placed on the ground near the dipping vat. Next, they are put into a circular wire basket, which holds a few pounds of grapes, and dipped into a vat of boiling sodium solution.

The "vat" is simply an earthenware or metal container of possibly 12-gallon capacity enclosed in adobe and suspended over a small fire fed by kindling wood. It is filled with water "to which is added a pumice-like substance obtained by burning the roots of a desert plant. Analysis of this substance called 'moew' reveals that it contains a considerable amount of soda." 2/ Some growers add paraffin to the soda solution. Several years ago a prominent Iranian packer imported a commercial grade of sodium hydroxide which would enable the use of standardized solutions and also dissolve completely without leaving a sediment. The growers, however, refused to use this unfamiliar substance.

The wire basket full of grapes is immersed in the hot solution for just a few seconds. (The person dipping is supposed to count to 4 or 5.) After withdrawal from the vat the fruit is permitted to drain briefly; then it is put onto large flat containers and carried to the adjacent yard, where the grapes are simply spread on the bare ground. The fruit is not rinsed after immersion in the soda dip. (According to technicians there, Iranian raisins would be less sticky if the grapes were rinsed in water immediately after dipping.)

2/ According to George Schneider.

The dry yard resembles a clay tennis court in surface and size and, although flat, it often slopes to the south so that the grapes receive maximum exposure to the sun. The yards seen in Azerbaijan ranged in size from 35x40 feet to 70x40 feet. Most were enclosed by high walls to reduce windborne dust and theft. Before harvest, dry yards are cleared of weeds. Then, a slurry of wet clay mixed with straw is "plastered" smoothly over the ground which, when dry, is a relatively hard smooth surface. In some dry yards the ground is swept with a broom just before the grapes are laid down to dry.

After drying, the raisins are gathered together. Stalks and the separable foreign matter are than picked out by hand, and the raisins are loaded into burlap bags for shipment to merchants and packers. The bags are of varying sizes--40, 60, and 100 kilograms (88, 132, and 220 pounds). Since burlap bags represent a cash cost, they are relatively precious and producers try to get by with as few as possible. They, therefore, tend to jam as many raisins as possible into a bag, which is then loaded on a donkey or camel and transported over unpaved roads. Bags of raisins were observed arriving at merchants' premises in which the raisins were so crammed that they formed a large solid mass of berries adhering to each other.

A very small percentage of the raisin crop is made by dehydrating grapes directly--as is done in the case of California's golden bleached raisins. The production of such raisins is limited to the Kazvin area.

Packing Methods

Iranian packinghouses process three basic types of sultanas for export, Bidonas, Originals, and Sabsas. In addition, a minor quantity is dehydrated in the packinghouse (rather than sun-dried), after being sulfured. These, of course, have a brighter appearance than any of the three main types and are called Goldens.

Bidonas.--These are "naturals." They have been simply sun-dried by the grower and have been neither dipped into soda nor bleached with sulfur. As a result they are dark in color--popularly described in the European trade as "bluish brown." They are destemmed, and cleaned only to the extent that such foreign matter as sand, stones, and soil can be mechanically shaken free from the raisins. Hand-sorting the raisins also removes some foreign matter and raisins encrusted with dirt. However, the raisins are generally not washed, and, therefore, may have small particles of foreign matter clinging to them. Usually, they are designated simply as "Bidonas" or "Cleaned Bidonas" or "Naturals." When washed, they are designated as "Washed Bidonas."

Only about 10 to 15 percent of the Iranian export pack consists of Bidonas, in the opinion of some leading exporters.

Originals.--This refers to raisins which have been dipped in soda solution, sun-dried, and then cleaned mechanically in the packinghouse. They are not subjected to washing and sulfuring in the packinghouse. Their color is intermediate--distinctly lighter than that of the Bidonas but somewhat darker than that of sulfur-bleached raisins. They are usually designated by the area they originate in and may be known simply as Urmias, Maraghehs, or Kazvins or as Original Cleaned Urmias, Maraghas, Kazvins. In either case they are just mechanically cleaned and hand-sorted but unwashed. As with the Bidonas, removal of capstems and mechanical cleaning are simultaneous.

Possibly half of the Iranian export pack consists of these Originals.

Sabsas.--These are raisins which have been soda-dipped and sun-dried by the grower and then washed, sulfured, and redried by the packer. Capstems are removed and berries hand-culled too, as with the other types. These raisins are of course superior to Bidonas and Originals, being lighter in color and considerably cleaner. In the trade this type of raisin is known as a washed raisin, such as Washed Maragheh, Urmia, Kazvin.

As a rough estimate, perhaps one-third of Iran's raisins are processed in this manner.

Packinghouses

There are a great many packinghouses in Iran, probably over 100. In Azerbaijan alone there are said to be 50 or 60 of them. Size of operation and degree of modernness vary considerably; but the bulk of them are small and primitive. A daily output of a few hundred cases (of 12½ kilograms each, i.e., 27.6 pounds), or roughly 5 tons, is probably the most typical size of operation.

Packinghouse in Malayer.
Concrete wash tubs at right.

The typical packinghouse is a rambling, mud-walled one-story building enclosing a large inner courtyard. The courtyard may be cobblestoned or unpaved; in the latter case it is dusty in dry weather and muddy following rain or snow. The courtyard serves an important function: it is here that washed fruit is redried in the sun, when the weather is warm enough.

The building is partitioned into many small rooms. It is old, dimly lit, unventilated, and unheated despite cold weather during much of the processing season. The floors are rough--of concrete, cobblestones, or pounded earth. The processing in such a plant is as follows:

1. The raisins are emptied from burlap bags onto the floor. The large lumps of berries sticking to each other are broken up by men with paddles.

2. The raisins are loaded into boxes, carried into another room, up onto a platform, and dumped into a hopper--which leads into a capstemming machine. All of this is done by hand.

3. The raisins are destemmed and dropped onto shaker screens which sieve out such foreign matter as small stones and sand and also separate out midget-sized raisins.

4. Paraffin oil drips down onto the raisins from a small container located above the hopper.

5. The destemmed raisins are fed by the shaker-screen into 40-kilogram (88 pounds) boxes. These are carried into a nearby room and emptied into shallow wooden trays. In this room, women and children squat on the floor and sort seeded raisins, bruised, discolored, and otherwise defective sultanas, and foreign matter into various-sized boxes and tin cans. Some of the women have infants or very young children with them.

Girls sort raisins in a modernized packinghouse at Rhazwin.

6. The sorted raisins are then carried into still another small room. Here, new 12½-kilogram wooden boxes (usually poplar) are lined with wax paper, filled and weighed by hand, and nailed shut and bound with wire--also by hand.

7. The boxes are carried into another room and stacked. No mechanical equipment, not even hand trucks, are used.

This is the complete process for Bidonas or Originals. However, when the raisins are to be Sabsas (sulfur-bleached), three additional steps are taken before they enter the capstemmer.

(1) The raisins are washed: they are placed in colendar-type containers or trays of metal screening and shaken--by hand--in a water trough.

(2) The washed raisins are then put on small, crude, wooden trays and placed in sulfur chambers for about 4 hours.

(3) The trays are removed from the sulfur chamber and spread out in the courtyard to dry under the sun for 2 or 3 days.

Washing, sulfuring, and redrying in the sun can only be practiced a short time in the fall before the weather becomes too cold and wet. Packers may, therefore, store unsulfured, uncleaned, soda-dipped raisins on their premises all winter, and then, in the late spring resume washing, sulfuring, and sun-drying. Raisins so handled are described as "summer pack" or "summer washed." They are well known in Germany and the Netherlands. They have a certain popularity because they can be shipped to the European importer at a time (late summer and early fall) when new-crop Iranian raisins are not yet available. The German trade considers them as good as new-crop raisins with the qualification that they have a tendency to sugar and should be consumed without delay.

The contrast between the usual Iranian packinghouse and the modernized Iranian plant is as great as between typical Iranian and Californian packinghouses. The difference is not so much in the plant capacity as in automaton, sanitation, and working conditions; daily output might not be much larger but output per worker and quality of product are much superior. Also, the processing season is much longer in a plant which practices artificial dehydration and is therefore not dependent upon the weather for sun-drying.

A large packinghouse that had been completed $5\frac{1}{2}$ years earlier was visited in early 1960 at Kazvin. This plant consisted of two big adjoining buildings built of concrete and steel and faced with brick. The yard surrounding the buildings was of concrete. Small rail carts that moved on steel tracks embedded in the concrete were used to transport raisins about the premises.

In sharp contrast to the typical Iranian packinghouse, this plant was strikingly clean, light, airy, roomy, and weather-tight. It had large modern casement windows and generous artificial lighting. Both buildings were high-ceilinged and the interiors entirely free of the many partitions that characterize old plants. Operations in the main building were conducted at two levels--the upper story being a steel balcony. The floors were of smooth concrete, and the interior walls were surfaced with vitreous tile up to a height of perhaps 5 feet. Plenty of good storage space was also a distinctive feature.

The processing procedure in the plant is as follows:

1. The raisins are dumped out of 100-kilogram (220 pounds) burlap bags into a separator, consisting of a pair of large horizontal sieves, one above the other. This separates the berries from each other and also eliminates some of the foreign matter.

2. A conveyor transfers the raisins into a mechanical washer--an elongated cone-shaped cylinder of heavy screening--through which the raisins whirl around in water until they come out at the narrow end.

3. The raisins then pass into a centrifuge-type of drying machine where excess water is driven off. The fruit is then loaded onto flat metal trays (with heavy screen bottoms), which in turn are loaded into rail carts. The rail carts are actually metal racks which contain 24 trays each.

4. If the raisins are to be sulfured, the carts are wheeled into sulfur chambers--low tunnel-shaped structures--where they are sulfured for 3 hours. A pump circulates the sulfur fumes within the chambers. There are two sulfur chambers side by side, with tracks running through them, so that the carts are wheeled in through one end and out the other.

5. The trays of raisins, either those washed and sulfured (Sabsas) or those simply washed (naturals, i.e., Bidonas) are then railed into the next building into the dehydrators. There are three dehydrators, side by side, heated by steam pipes which are covered with metal fins that radiate the heat. They are fueled by oil, a cheap fuel in oil-rich Iran. The raisins are kept in the dehydrators 4 hours. Rails also traverse the length of the dehydrators, and each successive rack of trays entering a dehydrator pushes the previous rack farther along the track until it finally emerges from the far end of the dehydrator. As they progress through the dehydrator, and lose moisture, the raisins are subjected to gradually lower temperatures so as to forestall possible scorching. Upon emerging from the dehydrators the raisins are run through a cooling unit. The dehydration capacity is 13 short tons in 20 hours.

Moisture is reduced to 16 to 17 percent.

6. The dehydrated raisins are then conveyed into the capstemmer--a square wooden structure with cabinetlike doors. Inside it, nylon and rubber blades propelled by a shaft revolve within a wire mesh drum which also revolves, but in the opposite direction. The capstems are rubbed off the berries when the blades force them against the meshing. The destemmed raisins drop down on a shaker-screen which sizes them and also separates out foreign matter.

This operation reduces to 7 to 8 percent the proportion of fruit which has capstems.

7. The raisins are then conveyed to the upper level where they are passed through a motor-driven cleaner, which both blows off light foreign matter and shakes loose stems and other heavy foreign matter.

Modernized packinghouse, Ghazvin. Top left. trays and sulfur chambers. Top right, capstemmer. Left, dehydrators.

8. The cleaned raisins are next hand-carried in wooden boxes (88 pounds when full) to the sorting belts. These moving belts are probably as radical an innovation as could be imagined in an Iranian packinghouse. There are three, with 14 women and girls seated on high stools at each belt. They sort out seeded raisins--a major chore--and dark, deformed, broken, decayed, and otherwise defective sultanas. The three belts converge on a fourth, where another crew of 14 perform a final culling on the once-sorted raisins.

9. Paraffin oil drips down upon the raisins as they move from the last sorting belt into a chute down to the first floor.

10. On the first floor the raisins are either boxed for shipment in the 12½-kilogram boxes or loaded into the 40-kilogram boxes, and stacked for future disposition. Filling the boxes for shipment, weighing the contents, and lidding the boxes are all done by hand. A hand press with a long lever, operated manually, is used to compress the raisins in the 12½-kilogram boxes.

This plant has a capacity of 13 short tons per 10-hour shift. The dehydrators have to run twice that long to handle this tonnage. Also, female sorters are supposed to work no more than an 8-hour shift.

Water is supplied by a deep well which is entirely adequate for the plant's needs. However, water disposal is a problem since this is a populated area, so it is necessary to dig pits to hold waste water.

Interestingly, three or four other plants at Kazvin have also installed dehydrators since 1957. The remaining plants at Kazvin, possibly a dozen, are the traditional packinghouses, working only during the summer and early autumn on washed and sulfured fruit when it can be sun-dried.

Another type of processing being practiced on a very limited scale but which may be expanded is the dehydration of grapes. About 35 miles from Kazvin, a grape-dehydration plant has been operated by the same firm which ran the modern plant described in Kazvin. This dehydrator produced 5½ short tons of raisins per 24-hour day for a 40-day season, giving a total production of 220 tons. These raisins are produced in a manner similar to that for California Golden-Bleached and are even called "California type" by the Iranians.

The Plan Organization--an Iranian Government body which is financed largely by oil royalties--has completed construction of an ultramodern packinghouse at Takistan, 20 miles southwest of Kazvin. Technical assistance on the layout and operation on the plant was furnished by the United States Government economic aid mission. Cost of the plant has been estimated as over $2,000,000. Annual capacity is 6,000 tons, in 5 months of operation on a one-shift basis. In addition to processing sun-dried raisins received from the growers, fresh grapes will be taken in and soda-dipped, rinsed, sulfured, and dehydrated into golden-bleached raisins. The latter may account for 1,500 tons of the 6,000-ton output.

The sun-dried raisins handled by this Plan Organization plant are to be exceptionally high quality due to special measures: the packinghouse will furnish trays to the growers so that the raisins will not be dried on the ground; tarpaulins will be furnished the growers so that the drying fruit can be protected against rain; growers are to be educated to cut the grapes later than is customary--when the grapes contain 21 percent sugar instead of the usual 18 percent; and growers are to sell directly to the packinghouse instead of to middlemen and thereby receive premiums for improved quality. The plant is to carry on experimental work and extension activities in viticulture but is also expected to operate at a profit. Other fruit items are also to be processed there eventually. Although not privately operated at first, it is envisaged that a growers' cooperative will take over after several years. The plant was able to begin processing fruit in the fall of 1960, when a few hundred tons were reportedly handled.

The Plan Organization had already constructed--in 1957--a model packinghouse in Maragheh for the processing of raisins, dried apricots, and almonds. However, this plant was still not in operation at the time of the writer's visit in early 1960. Inadequacy of the water supply and mechanical difficulties with the equipment were given as the reasons for the plant's inactivity. However, the Plan Organization expected the plant would be in working order for the 1960-61 season, with an output of 1,000 metric tons.

Packaging

The 12½-kilogram wooden box (27.6 pounds) is universally used in Iran. It is usually made in the locality of the packinghouse--from poplar, which appears to be the most common tree in the vineyard regions. According to packers in various areas, the cost of a box ranges between 15½ and 18½ cents.

An interest is developing in cardboard cartons, but they have been tried only in isolated instances. The cartons are said to cost about 20 cents; but the higher price may be offset by lower labor costs in assembling and closing them. Those tried contain 14 kilograms (30.9 pounds) of raisins; they were imported from Greece.

The Plan Organization intends to use 14-kilogram cartons, 500-gram cellophane bags, and 15-ounce consumer cartons.

Labor

In Iran, labor is abundant and cheap. As a result, virtually everything in packinghouses is hand-carried, hand-sorted, or otherwise done by hand. The very cheapness of the labor is conducive to the innefficient use of it. It is rare, for instance, to find even the simplest wheeled equipment.

The working force in the processing industry consists predominantly of women. Children are also employed. They and the women perform the sorting and light hauling; a few men are used to service what machinery there is, to assemble boxes, and to do the heavy hauling.

The number of workers per plant seemed to be fairly proportionate to the plant capacity. In those packinghouses with a capstemmer-shaker machine of 5 metric tons capacity per work shift of 8-9 hours (a rather common size in plants visited), there were roughly 100 employees. In those with two such machines, producing 10 metric tons daily, there were 200 employees, more or less. Some plants are more efficient in their use of labor than indicated by this ratio, others less so. In the modern plant at Kazvin, the labor force was noticeably smaller than in older plants with similar output. This plant employed only 100 persons, though it had a daily production capacity of 12 metric tons.

Much of the labor is paid on a piecework basis. However, it was possible to obtain some approximation of the daily wage. In Azerbaijan packinghouses, women earn 25 to 40 cents per day for the usual 8-hour shift. The wages are lowest for women who have babies with them in the plant. Children working are paid 15 to 20 cents per day. Men make about 65 to 80 cents. In Kazvin and Tehran, wages are higher, the women receiving upwards of 45 cents daily and male mechanics as much as $1.25.

Processing Costs

These are very difficult to ascertain. According to the delegation of the Australian Dried Fruits Control Board, which surveyed Iran's raisin industry in 1959, processing costs in a modernized Iranian packinghouse amounted to $70 per short ton, in round figures. In the more typical, old-type plant, they estimated the processing costs at approximately $50 per ton. The comparison here, however, is between the costs of packing a good-quality product and a poor product.

There is undoubtedly a considerable range in costs even among plants that are similarly primitive (or similarly modernized) due to regional differences in wage levels and quality of fruit delivered by growers, not to mention differences in efficiency in the management of individual plants. As an example of regional differences in the fruit itself, packers cite the fact that the waste percentage (screenings and culls) is only 5 to 10 percent in Azerbaijan compared with 10 to 15 percent in the Ghuchan-Saltanabad area and 15 to 20 percent at Kazvin.

The processing cost of roughly $70 per short ton is fairly comparable to that of Greek packinghouses; but as noted, this only applies to the relatively few modernized Iranian plants. However, the quality of the processed fruit in such Iranian packinghouses would be more nearly comparable to that of Greek packinghouses--for bleached fruit--than would the fruit originating in the primitive-type Iranian plants, where the processing costs are reportedly only $50.

A serious cost disadvantage suffered by Iranian packers is the high cost of credit. Interest rates such as prevail in Western countries are unknown in Iran; 20 percent interest, for example, is not at all unusual in Iran, and even considerably higher rates may be charged. Though Greek packers may have to pay interest rates that are also exorbitant by American or West European standards, they are not nearly as extreme as in Iran and, furthermore, Greek packers have some access to moderate rates under government programs.

Grades

There are no standard grades in Iran. It is probably the only major exporting country which has no uniform standards of any kind--neither traditional voluntary standards as practiced by the Greek trade--nor governmentally established and enforced export standards as in Turkey.

Individual Iranian packers of course have their own grades, with the result that there are great variations between different packers' standards. Some of the larger more modern firms have developed individual standards that are comparable to those for Turkish or Greek sultanas and are considered fairly reliable by Western European importers.

The Iranian Government, with the assistance of United States, has set up an Institute of Standards. This Institute is developing grades and standards for many Iranian commodities, including dried fruits. It has already developed export standards for raisins, but legislation by the Iranian Parliament will be necessary to give the Institute legal authority to promulgate these standards, not to mention authority to enforce them. These standards, by the way, were first subject to review and modification by a commission consisting of representatives of the Ministry of Commerce, Ministry of Agriculture, the Iranian trade, and non-Iranian advisers.

There is considerable uncertainty whether to make the standards compulsory, and in any case, how the standards should be enforced. The prevailing feeling--in the Iranian Government as well as the trade--is that the Institute should not be responsible for the inspection itself, i.e., the Institute should only set up the standards. It is contemplated that another agency, government or private, would carry out the inspection.

The standards are patterned after those of the United States Department of Agriculture. The same categories of defects are designated, with specified maxima for each: "Capstems," "stems," "seeds," "poorly developed" berries, "damaged raisins," "visibly sugared" berries, and fruit injured by "mold," and by "fermentation." The defect, "damaged raisins," encompasses raisins which have been seriously injured by insects, sunburn, scars, and embedded dirt or foreign matter. There are also limitations on the presence of insect particles or excreta. Live insects would not be permitted in graded raisins.

Moisture content, as in USDA standards, would be limited to 18 percent.

The Institute found, based on research in the field and in its laboratory in Tehran, that it would be most desirable to set up three grades: No. 1 or Fancy, No. 2 or Good, and No. 3 or Standard.

Although size of berry was not considered a factor in the quality of fruit, it was decided to establish three size classes--Large, Small, and Mixed Sizes--to assist buyers and sellers in filling orders for specific purposes, i.e., manufacturers of confections in many instances prefer small fruit while some confectioners and the grocery trade insist on large fruit.

Standards of Fancy, Good, and Standard have also been proposed that would apply separately for (a) Naturals, and (b) for Soda-Dipped and Sulfur Bleached. The same categories of defects, i.e., "capstems," "stems," "seeds," etc. would be applied to each of these types but the proposed tolerances are much laxer for soda-dipped and sulfur-bleached raisins than for natural, undipped, sun-dried raisins. This is significant in assessing proposed Iranian standards, since the overwhelming bulk of Iranian raisins--possibly 85 to 90 percent--are soda-dipped, and approximately one-third are, in addition, sulfured.

It is also of interest that the proposed standards, though modeled after the USDA standards, omit any mention of the presence of grit, sand, or silt as a defect.

The proposed standards stipulate that the color of soda-dipped and sulfur-bleached raisins is not indicative of quality. It is pointed out that under Iranian conditions it is not possible to produce batches of uniform color, and that the color of Iranian raisins that have been soda-dipped, or both dipped and sulfured, normally range from dark amber to golden or greenish yellow. It is, therefore, stated that such raisins "...shall be determined as meeting the color requirements...which possess a color ranging from greenish yellow or golden to dark amber. Not more than 15 percent by weight...may be dark raisins of unbleached color."

However, exporters would be obliged to give some indication as to the color: "The color of any lot of soda-dipped and/or sulfured raisins shall be certified in the form of a statement which shall certify the overall range of color present, shall state the colors or color which predominates generally throughout the lot and state the percentage of dark raisins of unbleached color present. To illustrate--'Color of lot ranges from golden to dark amber, generally amber to dark amber, mostly amber. 2 percent dark raisins of unbleached color.'"

It is apparent from these color standards that in this respect, too, the proposed Iranian standards would be much more similar to U. S. standards than to those of Greece or Turkey.

The proposed standards would not endeavor to control the use of preservatives, fumigants, sulfur, or any other chemical. The proposed standards state explicitly that the use of these substances in raisins for export is to be "governed by restrictions and regulations of the country of destination."

Utilization

In the absence of reliable statistics on production and consumption, any attempt to develop figures on utilization of the Iranian raisin crop would represent little more than a guess. The only reasonably reliable figure that can serve as a mainstay in a supply-disposition balance is the raisin export figure, which is a tabulation of actual export shipments by Iranian customs officials.

Alternative Uses

As earlier indicated, approximately 65 percent of the sultana grapes are dried into raisins. The balance is used in various ways. Probably the most important of these is consumption as fresh fruit. Grapes--in season--are fundamental to the average Iranian's diet. In fact, the usual summer meal consists of grapes, bread, and sheep cheese. Another common use of grapes is in the making of "pekmes," or grape sugar. Grapes are boiled down, in the household, till only a thick sticky sweet residue remains--resembling a heavy honey. This serves as sugar or a bread spread. Some grapes are also pressed for juice, but probably only a minor quantity. Wine also represents an outlet for some grapes, but is not of great importance since Iran is predominantly a Moslem country. It is commonly believed, however, that the consumption of wine is on the rise in Iran.

Domestic Disappearance

Raisins are used within Iran in substantial quantities. In the five seasons 1954-55 through 1958-59, estimated domestic disappearance ranged between 23,000 and 30,000 tons annually.

TABLE 2.--Supply and disposition of raisins in Iran,
annual 1954-58 and average 1/

Item	1954	1955	1956	1957	1958	Average 1954-58
	1,000 short tons	1,000 short tons	1,000 short tons	1,000 short tons	1,000 short tons	1,000 short tons
Beginning stocks..........	1.0	1.0	1.0	1.0	1.0	1.0
Production................	55.0	66.0	68.0	72.0	69.0	66.0
Supply....................	56.0	67.0	69.0	73.0	70.0	67.0
Exports...................	29.3	43.0	43.3	46.6	36.9	39.8
Domestic disappearance....	25.7	23.0	24.7	25.4	30.1	25.8
Ending stocks.............	1.0	1.0	1.0	1.0	3.0	1.4
Disposition...............	56.0	67.0	69.0	73.0	70.0	67.0

1/ Years beginning mid-August.

It is apparent that the internal disappearance is unstable and fluctuates from year to year. There are two main domestic outlets for raisins: Food and industrial use. Each may vary appreciably from one year to the next. The domestic market for edible-quality raisins is more or less a residual. According to some packers there is demand within Iran for at least 7,000 short tons of raisins for food, and in some years they are able to dispose of 11,000 tons for edible use in Iran. In other words when foreign demand is strong the domestic market tends to be slighted; but when it is difficult to move the pack into foreign markets, the converse is true. For a population of 20.6 million, these tonnages represent a per capita consumption ranging from nearly seven-tenths of a pound to slightly over a pound per capita annually. Such a per capita consumption level roughly approximates that of the other Middle East producing countries--Greece and Turkey--but is much smaller than that of the Western European countries. However, it must be emphasized that these estimates for Iran are based on the raisin industry's judgement rather than statistical evidence.

The nonedible portion of domestic disappearance includes waste and substandard fruit. The waste percentage is substantial, what with stones, dirt, and seeded fruit in addition to the usual stems, capstems, defective berries, and grit. Furthermore, due to shortcomings in the field-drying, handling, and storage of the fruit, an appreciable percentage of the pack may "sugar" in the course of the season and thus be rendered unsalable for export.

Distillation into alcohol has been the main outlet for substandard fruit. Some is also converted into sirup. The alcohol outlet has been shrinking, however, and is no longer the important outlet it once was. This is attributable to the Iranian Government's postwar policy of increasing beet sugar production. Over the past 10 years, sugar output has expanded greatly and mills have been built in different parts of the country to handle the larger crop. These mills now ship considerable quantities of molasses to the alcohol factories. At Rezaiyeh, for example, an alcohol factory which depended entirely on raisins--reportedly 1,000 tons annually--is now using over 90 percent molasses and less than 10 percent raisins for alcohol. This displacement of raisins may explain in part why domestic disappearance, as a percentage of the total crop, has declined. Before World War II, 61 percent of the crop was disposed of domestically; this proportion declined slightly--to an average of 58 percent in the 6 crop years, 1948 through 1953, and then dropped noticeably, to an average of only 40 percent in the 5 crop years, 1954 through 1958.

In absolute terms, the total volume entering domestic outlets has hardly changed. It is probable that the two components of domestic consumption have moved in opposite directions--industrial usage declining and edible use increasing, owing to greater population and rising consumer income.

Exports

In recent years Iran has exported, on the average, about 40,000 tons of raisins annually. Iran's importance in the world market as a raisin supplier has increased greatly--in absolute and relative terms. In the 1934-38 period Iran exported an average of only 14,028 tons annually, representing 6 percent of world raisin trade, in contrast to the postwar peak in the 1957-58 marketing season of 46,609 tons, or 18 percent of world exports:

Year	Iranian exports	World exports	Iranian share
	Short tons	Short tons	Percent
Average:			
1934-38	14,028	238,886	6
1951-55	32,272	269,250	12
Annual: 1/			
1955	42,959	280,446	15
1956	43,304	272,030	16
1957	46,609	265,832	18
1958	36,883	248,382	15

1/ Crop year beginning about September 1.

Iranian exports in seasons subsequent to 1957-58 have been somewhat smaller, first because of intense foreign competition, and, most recently (1960-61), because of a small crop brought about by unfavorable weather.

The bulk of Iran's raisin exports goes to Europe, and nearly all of the balance to the Soviet Union. Western Germany is far and away the largest single customer of Iranian raisins. In the 5 crop years, 1954-55 through

TABLE 3.--Exports of raisins from Iran by country of destination, average 1934-38, 1949-53 and 1954-58, annual 1954-58 1/

Country of destination	Average			Annual				
	1934-38	1949-53	1954-58	1954	1955	1956	1957	1958
	Short tons	Short tons	Short tons	Short tons	Short tons	Short tons	Short tons	Short tons
United States	1	12	104	32	--	--	13	474
Europe:								
Belgium-Luxembourg	602	63	29	43	24	77	4	--
Czechoslovakia	5	--	1,150	55	61	55	2,751	2,827
Denmark	18	3	148	248	--	77	47	366
France	--	628	1,916	692	1,846	1,739	3,823	1,479
Germany, W. 2/	4,075	11,034	19,160	15,163	24,667	18,325	22,664	14,979
Hungary	--	--	200	--	--	--	--	999
Italy	23	210	58	11	75	--	53	149
Netherlands	1,324	1,201	3,168	3,027	5,637	2,807	2,292	2,075
Norway	--	5	58	--	--	14	37	241
Sweden	68	284	33	69	18	--	--	77
United Kingdom	1,056	3,090	3,089	2,466	1,580	2,076	3,369	5,955
Other	20	59	20	--	--	9	79	13
Total	7,191	16,577	29,029	21,774	33,908	25,179	35,119	29,160
Other countries:								
Ceylon	--	12	67	105	18	209	3	--
Egypt	--	--	89	51	395	--	--	--
India	575	458	1,145	1,689	1,201	1,764	554	517
Iraq	193	496	937	1,184	833	1,040	677	951
Japan	1	--	74	--	--	372	--	--
Kuwait	8	317	383	243	604	606	140	321
Oman	24	300	137	111	95	216	104	161
Pakistan	--	176	13	43	11	2	--	7
USSR	6,033	4,560	7,773	4,049	5,854	13,912	9,934	5,117
Other	2	64	3/ 56	--	40	4	65	4/ 175
Total	6,836	6,383	10,674	7,475	9,051	18,125	11,477	7,249
Grand total	14,028	22,972	39,807	29,281	42,959	43,304	46,609	36,883

1/ 1934-38 average, years beginning June 20; 1949-53 average, years beginning March 20; 1954 onward, years beginning August 23. 2/ Not separately classified as to East and West Germany prior to January 1951. 3/ Includes 12 tons to Syria and 28 tons to Lebanon. 4/ Includes 63 tons to Syria.

1958-59, Germany took an average of 19,160 tons annually, or virtually half of Iran's raisin exports.

The Soviet Union is the next most important outlet; but its takings average less than half of the German purchases--7,773 tons annually. Trade with the Soviet Union, however, is quite erratic: from one year to the next, Soviet purchases may jump by over 100 percent or drop by 50 percent. Political considerations toward Iran or other raisin-exporting countries may be a factor in these fluctuations.

Other important customers are the United Kingdom and the Netherlands, followed by France, Czechoslovakia, India, and Iraq. Generally speaking, there has been little change in the present pattern of trade when compared with earlier years. About the same countries have continued as Iran's customers but the volume purchased is larger.

Export outlets have taken an increasing share of the Iranian pack. Before World War II (1934-38), 39 percent of Iran's raisin pack went into export channels. In the six seasons, 1948-49 through 1953-54, an average of 42 percent of the Iranian pack was exported, and in the subsequent five seasons, 1954-55 through 1958-59, the proportion going into export rose to 60 percent. These averages, of course, conceal year-to-year fluctuations which in some cases were large.

Iranian raisin exports are made later in the marketing year than are the Turkish or Greek. This, of course, places Iran at a disadvantage vis-a-vis its Middle East competitors, who are able to make the bulk of their sales when the seasonal demand in importing countries is at its peak. Iran, because of its later harvest, less efficient processing plants, and transportation disadvantages, is often not able to ship out more than half of its pack in the period between mid-August and mid-January. In recent years, it exported the following percentage of its season's total exports, in the 5-month period, August 23 1/ to January 21.

	Percent		Percent
1953-54	32	1956-57	47
1954-55	43	1957-58	2/
1955-56	56	1959-60	56

1/ The Iranian calendar does not correspond with the Western calendar; Iranian months begin about the 20th. 2/ Unavailable.

In contrast, about three-fourths of the season's export movement of Greek raisins is usually completed by February 1; the corresponding movement of Turkish raisins is usually over 70 percent. While October and November are generally the heaviest months of raisin exports in Greece and Turkey, the December-January period is frequently the heaviest for Iranian raisin exports.

Iranian exports of grapes though still minor in tonnage have also risen in recent years. It is not known how many sultanas are included among the varieties exported as fresh grapes. The exports of Iran's grapes are entirely to the nearby Persian Gulf sheikdoms of Oman and Kuwait:

Country of destination	Year beginning March 21		
	Average 1934-35/1935-36	Average 1945-46/1949-50	Average 1954-55/1958-59
	Short tons	Short tons	Short tons
Total	148	88	1,281
Oman	68	13	828
Kuwait	78	75	453
Other	2	--	--

Iranian packers are optimistic about continuing expansion of grape exports.

Prices

Export Prices

Prices for only a few of the many Iranian types of sultanas are regularly quoted in the major importing countries. Those for the Rezaiyeh are probably most frequently listed in Western European market centers. In the United Kingdom they are designated as "Urmias" and on the Continent as "Urmiahs." Prices for raisins from Maragheh are next most often cited, usually spelled "Maraghas." Raisins from Kazvin are frequently offered as "Kasvins" in England and "Kashwin" or "Khazwin" on the Continent. Quotations for "Goutzan" raisins, i.e., from Ghuchan, are also sometimes listed by continental importers.

All of these types of raisins are quoted on 2 bases: Washed and unwashed. The latter are much more common than the former and are often described as "original" or "cleaned." As earlier indicated, the "original" or "cleaned" sultanas have been mechanically cleaned and hand-sorted but not washed. They have been soda-dipped but not sulfured. The "washed" sultanas, in addition to the above processes, have been washed, sulfured and re-dried.

Also frequently quoted are "Bidonas," the "Naturals." They are nearly always offered as simply "cleaned," i.e., unwashed. Infrequently, quotations appear for "washed Bidonas"--obviously the product of the few modernized packinghouses with artificial drying facilities.

Iranian prices, like those of other producing countries, rose sharply in 1957-58 when California suffered a short crop. They continued to increase to extraordinary heights in 1958-59, with the second successive short crop in California. Late in 1958-59, however, they began to decline when it became apparent that 1959-60 world production would be large. The decline became precipitous during 1959-60 as world production attained the largest volume since 1943. Although prices of all producing countries declined, Iranian prices fell most sharply, sinking to as low as 9.8 cents (landed, duty-paid, London) in July 1960. This was due to extreme difficulty encountered that season by Iran in marketing its pack abroad; foreign

TABLE 4.--Prices of specified types of Iranian, Turkish, Australian, Greek, and U. S. raisins, l.d.p., London, selected months, 1956-57 to 1960-61

Year and month	Iranian		Turkish		Australian 4-Crown	Greek No. 4 Natural	U.S. Natural Thompsons
	Maraghas and Urmias 1/	Bidonas 1/	No. 9	No. 10			
	Cents per lb.	Cents per lb.	Cents per lb.	Cents per lb.	Cents per lb.	Cents per lb.	Cents per lb.
1956-57:							
March	14.2	--	15.3	16.2	--	--	16.4
May	14.2	--	15.2	16.2	17.0	15.3	16.4
June	14.2	--	15.3	16.2	17.2	--	16.8
July	14.0	--	15.4	--	17.4	15.6	17.5
Aug.	14.0	--	15.4	--	17.2	15.6	17.5
1957-58:							
Oct.	--	14.3	18.2	18.7	18.2	16.2	19.9
Feb.	17.0	--	18.1	18.8	18.5	17.3	22.5
March	16.2	--	18.0	18.8	18.5	--	--
May	15.8	--	17.9	18.6	--	--	--
June	15.5	15.5	17.5	18.0	16.4	--	28.1
Aug.	15.3	15.3	17.2	17.8	16.5	17.2	--
1958-59:							
Sept.	15.2	15.2	18.3	18.9	--	17.5	22.5
Oct.	17.1	--	19.0	19.6	--	20.1	27.0
Nov.	17.1	16.0	19.8	20.1	--	--	28.6
Jan.	17.2	17.1	19.4	20.2	18.5	20.4	26.8
Feb.	17.6	17.0	19.8	20.4	--	--	25.8
March	17.3	16.0	19.1	19.7	--	--	26.2
April	17.2	16.0	19.0	19.5	18.0	--	25.4
May	16.2	15.8	18.8	19.4	18.2	18.6	--
July	16.0	--	17.8	18.8	18.4	--	19.2
Aug.	15.4	14.8	16.4	17.0	17.8	--	--
1959-60:							
Sept.	14.8	14.6	14.7	15.3	16.2	--	--
Oct.	13.6	13.6	15.1	15.8	16.2	13.9	16.2
Nov.	12.4	11.9	14.5	15.8	--	13.5	17.2
Jan.	--	10.3	13.6	14.5	--	12.8	14.6
March	11.9	8.8	13.4	14.3	--	12.3	14.1
April	11.6	--	13.5	14.1	--	11.7	13.0
May	10.9	--	13.7	14.1	14.6	--	12.9
July	9.8	10.4	13.4	14.0	14.6	--	12.7
Aug.	--	11.2	14.0	14.7	15.6	16.7	13.8
1960-61:							
Sept.	--	11.7	--	--	16.2	16.4	14.4
Oct.	13.7	12.2	15.8	16.1	17.0	--	15.4
Nov.	14.7	--	15.9	16.2	17.4	16.4	15.5
Dec.	14.8	--	16.0	16.3	17.6	16.3	15.8
Jan.	15.5	--	16.2	16.5	17.0	16.4	17.3

1/ Cleaned only.

The Public Ledger, London.

TABLE 5.--Prices of Iranian raisin types, cleaned and washed, selected periods, 1954-60

Item	Bidonas		Maraghas and Urmiahs		Kashwins		Goutzans	
	Cleaned	Washed	Cleaned	Washed	Cleaned	Washed	Cleaned	Washed
C.i.f. Netherlands:	Cents per pound	Cents per pound	Cents per pound	Cents per pound	Cents per pound	Cents per pound	Cents per pound	Cents per pound
1954:								
Dec. 1/	7.7	--	8.4	10.0-10.7	--	--	--	--
1955:								
Aug.	--	--	8.6	10.0-10.4	--	10.0-10.4	--	10.0-14.5
Dec.	--	--	11.3	14.5	--	14.5	--	14.5
1956:								
Sept.-Dec. 1/	8.6-10.0	--	9.5-11.0	10.4-12.8	--	10.4-12.8	--	10.4-12.8
1957:								
Oct.-Nov.	--	--	10.7-11.3	12.1-13.1	--	12.1-13.1	--	12.1-13.1
Early Dec.	--	--	14.3	15.9	--	15.9	--	15.9
Late Dec.	11.3	--	13.8	15.4	--	15.4	--	15.4
1958:								
Sept.	12.5-12.9	--	14.3	16.1	--	--	--	--
Dec.	14.1-15.0	15.0-15.9	15.0-15.4	16.8-19.1	--	--	--	--
1959:								
July	--	--	12.2	--	--	--	--	--
Dec.	--	--	8.8	--	--	--	--	--
L.d.p. London:								
1959:								
Jan.	17.1	19.0	17.2	19.0	--	--	--	--
Feb.	17.0	--	17.6	18.6	--	--	--	--
Mar.	16.0	--	17.3	19.1	--	--	--	--
April	16.0	--	17.2	19.1	--	--	--	--
Aug.	14.8	15.1	15.4	--	15.0	--	--	--
Sept.	14.6	14.9	14.8	--	--	--	--	--
Nov.	11.5	--	12.4	--	13.5	--	--	--
C.i.f. London:								
1960:								
Oct.	12.2	--	12.1	13.4	--	--	--	--
Nov.	--	--	13.1	14.0	--	--	--	--
Dec.	--	--	13.2	--	13.5	--	--	--

1/ F.o.b. Khorramshahr.

competition was heavy, and the quantitative restrictions that had been maintained in earlier years by some important importing countries against "dollar" (i.e., U.S.) raisins--which had benefitted Iranian exports, directly or indirectly--were no longer in effect. In periods of oversupply in world markets Iranian raisins appear to be most vulnerable, in view of their quality and delivery-date handicaps. At the end of the 1959-60 season, Iran reportedly had to carry over at least 5,000 tons of raisins--its heaviest end-of-season stocks in years.

It is obvious from the comparative prices that the most usual types of Iranian raisins appearing in West European markets sell for appreciably less than the most comparable competitive types. Only for part of 1956-57 and 1960-61 was the spread between the Iranian "Maragha" - "Urmia" types and Turkish No. 9 much less than 1½ cents per pound. The spread widened to 2 cents in the latter part of 1957-58 and to as much as 2½ to 3 cents at times in 1959-60. Iranian Bidonas have been consistently offered at considerably cheaper prices than Greek No. 4 Naturals, and particularly, California Natural Thompsons. In recent years for which comparative data are available, only rarely were Greek Naturals within 1½ cents per pound of the Iranian price, and at times the spread exceeded 3 cents and even 4 cents. The difference between Bidona and California Natural Thompson prices has been even greater, ranging from 2.3 to 12.6 cents per pound. Of course in 2 of these years, 1957-58 and 1958-59, California experienced crop failures while the Iranian harvests were exceptionally large. Also, the largest disparities between the Iranian and Greek prices occurred after it became known that the 1960 Greek crop was severely damaged by downy mildew.

Prices of the various Iranian types do not seem to differ markedly from each other. Maraghas and Urmias, for example, are almost invariably listed under the same price though they are produced in different areas.

Kashwins and Goutzans have also been generally quoted at the same price as Maraghas and Urmias. Washed Kashwins and Goutzans are more frequently quoted than simply cleaned Kashwins and Goutzans.

Bidonas are usually cheaper than the above types. The price difference varies considerably, however, undoubtedly due to shifts in the relative supplies or variations in quality.

Washed raisins carry a substantial premium over unwashed, i.e. "cleaned" raisins. Although this premium varies too, it usually ranges between 1.4 and 2.0 cents per pound.

Grower Prices

Prices paid by packers to growers in Iran have fluctuated wildly the last few seasons. This is well illustrated by 1957-58, 1958-59, and 1959-60 prices--selected because price information was available for these three seasons. Prices per short ton for these seasons are estimated as follows (in U. S. dollars per short ton):

	1958-59	1959-60	Early 1960-61
Most common price.........	180	100	) 155-165
Price range..............	165-235	75-145	)

These prices are at best only rough approximations: It is impossible to determine tonnages sold at given prices, and priced changed considerably in the course of each of these seasons. Information is also lacking on regional and quality differentials.

Whereas in 1958-59, prices opened at the lower end of the range shown and rose to the upper extreme during the season, the course was the opposite in 1959-60: prices opened at $145, their highest point of the season (though much below the 1959-60 peak), and declined to approximately $75. This was then followed by a very substantial increase in opening 1960-61 prices over the low levels at which growers concluded their 1959-60 sales.

Interestingly, the movement in Iranian grower prices between 1958-59 and 1959-60 closely paralleled those of California average grower prices, which declined 39 percent while Iranian prices declined 44 percent. However, grower prices in Iran have been much lower than in California or in Greece (in U. S. dollars per short ton):

	1958-59	1959-60	Early 1960-61
Iran, "most common"........	180	100	160
Greece, "security price" for No. 4 Natural........	206	198	212
United States, "season average".................	316	192	1/ 210

1/ Preliminary

Governmental Policy

Iranian production, marketing, and pricing of raisins have probably been as "free" as any among the raisin-exporting countries of the world.

Not only are there no grower or packer organizations of any consequence but there is also virtually no governmental intervention in pricing, grading, marketing, or production.

Producers and processors were apparently not dissatisfied with this unlimited economic freedom until the latter part of the 1958-59 season, when export prices began their precipitous decline. During this period of falling prices, the Iranian trade began to press the government to intervene with some form of export assistance.

Three possible means of aiding exports were considered by the government: (1) Direct export subsidies, (2) reduction of internal freight rates on raisins destined for export, and (3) providing cheaper credit to exporters than is normally available. In limited fashion, the latter two were put into effect.

In the fall of 1959, subsidized railroad freight rates were instituted for export shipments of dried fruits and nuts. The subsidy was equivalent to $14.25 per short ton on shipments from Tabriz to the port of Khorramshahr. Instead of $18.00 per ton, shippers had to pay only $3.75. This subsidy was terminated March 1960. Actually, it only served to make railroad transportation temporarily competitive with trucking. Truck rates, which are not fixed but result from bargaining, are said to average approximately $11.85 per ton compared to the $18.00 regular railroad rate. As a result, dried fruit usually moves by truck. The railroad subsidy was dropped despite insistence by exporters that it be maintained. The government, incidentally, is constructing a railroad from Tabriz to the Turkish border. This will enable Azerbaijan's fruit to travel across Turkey to west-Turkish ports.

Following termination of the railroad subsidy and demands by exporters that it be reinstated, the government in the spring of 1960 authorized the Bank Melli Iran to issue credits at only 6 percent interest for dried fruit exports. This, of course, is a far more favorable rate than is available in commercial channels (20 percent being not at all unusual). The Bank is authorized to lend up to 90 percent of the export value of the fruit, repayable when the exporter receives payment from the foreign buyer. The extent to which exporters have been able to avail themselves of this cheap credit is not known.

The Iranian Government has also been considering the establishment of a tax on dried fruit trade to provide funds for future subsidies for dried fruit exports.

In addition, it hopes to strengthen exports by improving the export product. The government plans to do this in two ways: First, through export grades and standards, developed by the Institute of Standards. Second, through its program of building model packinghouses with modern equipment. However, even if such problems in these plants as conversion of equipment to Iranian conditions and provision of adequate wash water are solved, it is still questionable whether the numerous small Iranian packers with limited capital would be interested in replacing their plants with expensive modern buildings and equipment.

Outlook

There is a widespread belief in the European import trade that Iran will provide ever-increasing competition for the other raisin-exporting countries. This belief is based on the premise that there will be a continuation of two recent trends: (1) The remarkable expansion of Iranian exports (from 14,000 tons prewar to 32,000 tons in the 1951-55 period to 44,000 tons in the 1955-57 period), and (2) the striking improvement in the cleanliness and grading of some Iranian raisins appearing in Western European markets.

At this writing however, it does not seem likely that Iranian exports will increase appreciably, if at all, over the 1955-57 average within the next 5 to 10 years. On the other hand, it does appear that an ever-larger volume of Iranian raisin exports will show marked improvement in cleanliness, grading, and packaging.

These forecasts are based on the following considerations:

Acreage.--No expansion of acreage is anticipated in most of the Iranian producing areas. A further increase, though not of major proportions, is expected in the Kazvin-Zanjan area. This would result in only a slight increase in the total Iranian acreage.

Yields.--Very little improvement in the yield per acre is probable. The barriers posed by illiteracy, poverty, land tenure, and virtual nonexistence of extension activity will be hardly breeched in this period of time--a very short period, by Iranian standards. The likeliest progress would be in the gradually spreading use of pesticides. Also, some limited acreage may benefit from additional irrigation water resulting from some new irrigation projects.

Production.--A slight increase in sultana grape production may result from developments mentioned above as well as from increased bearing surface in the young vineyards of the Kazvin-Zanjan district.

Field quality.--Very little improvement can be expected in the quality of the product that the growers sell to the packer. It is doubtful that many Iranian growers will, in the foreseeable future, adopt wood or paper trays or racks upon which to dry their sultanas. It is also doubtful that they will invest in plastic, canvas, or cotton covers to protect the drying fruit from rain.

It is further doubtful that they will handle the dried fruit more carefully than at present. It is true that the Plan Organization is planning to provide growers with sweatboxes and will furnish trucks to transport the loaded sweatboxes to its new processing plants. However, even if these plans materialize, only a very small proportion of the raisin pack would be affected. Most of the raisins would still be jammed into burlap bags and transported on animal back.

There may be some improvement in grower deliveries if export standards go into effect. Some sort of grades or standards might then be applied to grower deliveries as well. Growers may also become more careful in segregating plantings of seeded varieties and thereby reducing the present undesirable comingling of sultanas and seeded raisins.

Export quality.--The quality of the Iranian export pack should continue to improve noticeably. The modernization of existing packinghouses--often with the assistance of European importers--should, if anything, gather momentum. Such plants produce markedly cleaner and better graded fruit. As new Plan Organization plants come into operation, they too should produce higher grade packs than are now prevalent. Finally, once national grades and standards come into being, there would be greater uniformity, cleanliness, and freedom from defects in the Iranian export pack.

Export volume.--Iran may have difficulty in maintaining its 1955-57 export level of 44,000 tons for several reasons.

First, the steadily increasing population and standard of living mean greater internal consumption of raisins, at the expense of export availabilities. These factors may also mean somewhat greater consumption of sultana grapes, thus reducing the volume available for drying. Exportation of grapes may also expand further but, even then, it would represent only a very small proportion of the sultana crop.

Second, as grading improves, a larger percentage of the pack will be culled out as unfit for export. Part of these culls could, of course, be used for domestic consumption.

Third, as Iranian raisins are subjected to more thorough cleaning, grading, and culling, the processing costs are bound to increase. As pointed out, the price of washed Iranian raisins has usually been 1.4 to 2.0 cents per pound higher than normally "cleaned," i.e., unwashed, Iranian raisins. Also, Iranian raisins have generally been the cheapest available in European markets. It may be more difficult to sell higher priced Iranian raisins in outlets that have preferred low-priced, albeit poor-quality, fruit.

Last, but not least, production of--and competition from--Californian, Greek, and Turkish raisins is expected to increase.

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